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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/761,296	01/22/2004	Miki Onaka	1344.1130	3083

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EXAMINER

DIACOU, ARI M

ART UNIT PAPER NUMBER

3663

DATE MAILED: 04/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/761,296	<b>Applicant(s)</b> ONAKA ET AL.	
	<b>Examiner</b> Ari M. Diacou	<b>Art Unit</b> 3663	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 March 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action..
2. Claims 1-4, 9, and 12-14 and 18 are rejected under 35 U.S.C. 103(a) as being obvious over Kosaka et al. (USP No. 5943162) in view of Shimizu (USP 4898441).
3. Regarding Claim 1, Kosaka discloses: An optical amplifier having a polarization mode dispersion compensation function comprising:
  - a polarization mode dispersion generation section that has an optical transmission medium which has birefringence capable of giving a differential group delay between orthogonal polarization mode components of the signal light controlled in said polarization control section, and which is doped with a rare earth element; [Fig 2, #4]
  - a pumping light supply section that applies pumping light capable of pumping said rare earth element, to the optical transmission medium in said polarization mode dispersion generation section; [Fig 2, #6] [Col. 9, lines 12-15] [Col. 10, lines 64-67] [Col. 7, lines 11-16]
  - a monitoring section that monitors a polarization mode dispersion generation state of the signal light output from said polarization mode dispersion generation section; [Fig 2, #9] [Col. 9, lines 25-27]

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- and a control section that controls said polarization control section so that polarization mode dispersion monitored in said monitoring section is reduced.

[Fig 2, #10] [Col. 9, lines 27-29, 52-56]

but fails to disclose:

- a polarization control section that controls a polarization plane angle of input signal light to produce variable polarization states;

Shimizu teaches a polarization controller that can control the output polarization of a beam of light given an input with any polarization vector [Col. 2, lines 39-45]. Therefore, it would have been obvious to one skilled in the art (e.g. an optical engineer) at the time the invention was made, to replace the polarizers 12a and 12b of Kosaka with the polarization controller of Shimizu, for the advantage of controlling polarization without the loss of photons due to the use of a polarization filter.

4. Regarding Claim 18, Kosaka discloses: An optical amplifier having a polarization mode dispersion compensation function comprising:

- a polarization mode dispersion generation section having an optical transmission medium with a rare earth element; [Fig 2, #4]
- a pumping light supply section that applies pumping light to the optical transmission medium; [Fig 2, #6] [Col. 9, lines 12-15] [Col. 10, lines 64-67] [Col. 7, lines 11-16]

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- a monitoring section that monitors a polarization mode dispersion generation state of the signal light output from said polarization mode dispersion generation section; and [Fig 2, #9] [Col. 9, lines 25-27]
- a control section that controls said polarization control section, so that polarization mode dispersion monitored in said monitoring section, is reduced. [Fig 2, #10] [Col. 9, lines 27-29, 52-56]

but fails to disclose:

- a polarization control section that controls a polarization plane angle of input signal light to produce variable polarization states;

Shimizu teaches a polarization controller that can control the output polarization of a beam of light given an input with any polarization vector [Col. 2, lines 39-45]. Therefore, it would have been obvious to one skilled in the art (e.g. an optical engineer) at the time the invention was made, to replace the polarizers 12a and 12b of Kosaka with the polarization controller of Shimizu, for the advantage of controlling polarization without the loss of photons due to the use of a polarization filter.

5. Regarding Claim 3, Kosaka discloses: An optical amplifier having a polarization mode dispersion compensation function according to claim 1,

- wherein said monitoring section monitors the power of signal light output from said polarization mode dispersion generation section, [Fig 2, #9] [Col. 9, lines 27-29]

- and said control section controls said pumping light supply section so that the power of signal light monitored by said monitor section is fixed to be constant at a previously set value. [Fig 2, #10] [Col. 9, lines 27-29]

6. Regarding Claim 2, Kosaka discloses: An optical amplifier having a polarization mode dispersion compensation function according to claim 1,

- wherein said monitoring section monitors the power of signal light output from said polarization mode dispersion generation section, [Fig 2, #9] [Col. 9, lines 27-29]
- and said control section controls said pumping light supply section so as to obtain a gain which makes the power of signal light monitored by said monitor section to be the power at the time of input or above.

[It is clear that the clause j. of this office action is a special case of clause h., and Kosaka's invention could perform this function.]

7. Regarding Claim 4, Kosaka discloses: An optical amplifier having a polarization mode dispersion compensation function according to claim 1,

- wherein said monitoring section monitors the power of signal light output from said polarization mode dispersion generation section, and said control section controls said pumping light supply section so as to obtain a gain which makes the power of signal light monitored by said monitor section to be the power at the time of input or above. [Fig 5, #15] [Col 11, lines 21-24]

8. Regarding Claim 9, Kosaka discloses: An optical amplifier having a polarization mode dispersion compensation function according to claim 1, wherein said monitoring section comprises:

- a branching device which branches a part of the signal light output from said polarization mode dispersion generation section, as monitor light; [Fig 2, #8] [Col. 9, lines 24-33]
- an output monitor which monitors the power and polarization mode dispersion generation state of the monitor light branched by said branching device;
- and a pumping light interception device having a property for transmitting the signal light and intercepting the pumping light, which prevents leaked light of pumping light supplied to said polarization mode dispersion generating section from being input to said output monitor. [Fig 2, #5] [Col. 9, lines 12-24]

9. Regarding Claim 12, Kosaka discloses: An optical amplifier having a polarization mode dispersion compensation function according to claim 1,

- wherein an optical filter having a property for transmitting the signal light and intercepting the pumping light and amplified spontaneous emission light generated accompanying amplification of the signal light in said polarization mode dispersion generation section, is provided on an optical path through which the signal light is propagated. [Col 5, lines 51-57]

10. Regarding Claim 13, Kosaka discloses: An optical amplifier having a polarization mode dispersion compensation function according to claim 1,

- wherein when said polarization mode dispersion generation section is constructed by cascade connecting a plurality of optical transmission media having birefringence, a rare earth element is doped on at least the optical transmission media disposed on the signal light input side among said plurality of optical transmission media, [Fig 10]
- and said pumping light supply section supplies forward pumping light to the optical transmission media doped with the rare earth element, of said polarization mode dispersion generation section. [Fig 2, #5] [Col. 9, lines 17-19]

11. Regarding Claim 14, Kosaka discloses: An optical amplifier having a polarization mode dispersion compensation function according to claim 1,

- wherein when said polarization mode dispersion generation section is constructed by cascade connecting a plurality of optical transmission media having birefringence, a rare earth element is doped on at least the optical transmission media disposed on the signal light output side among said plurality of optical transmission media, [Fig 10]
- and said pumping light supply section supplies backward pumping light to the optical transmission media doped with the rare earth element, of said polarization mode dispersion generation section. [Fig 2, #5] [Col. 9, lines 17-19]



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12. Claims 5-8 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kosaka in view of Shimizu as applied to claim 1 above, and further in view of Sanders et al. (USP No. 6301273). Kosaka discloses an optical amplifier with all the limitations of claim 1, but fails to teach the application of the optical amplifier to a planar lightwave circuit. Sanders teaches an optical amplifier with a polarization mode compensation function and discloses the use of an erbium-doped waveguide, made in a substrate of lithium niobate. Therefore, it would have been obvious to one skilled in the art (e.g. an optical engineer) at the time the invention was made, to create an optical amplifier with the limitations and structure disclosed by Kosaka, but in the form of a planar photonic integrated circuit, for the purpose of modularity and miniaturization and all of the documented obvious advantages thereof.

13. Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kosaka et al. in view of Shimizu as applied to claim 9 above, and further in view of Hwang et al. (USP App. No. 10/854,347). Kosaka discloses an optical amplifier with all the limitations of claim 9, but fails to teach the functional equivalency of an isolator, a band-pass filter and a tap or a conventional optical fiber. Hwang teaches a wideband optical source composed of two fiber amplifiers with a plurality of connectors between them, including a mirror [Fig 2, #230], a filter [Fig 4, #432], an isolator [Fig 6, #630], and a coupler [Fig 3, #330]. Therefore, it would have been obvious to one skilled in the art (e.g. an optical engineer) at the time the invention was made, to substitute a filter [as in claim 10] or an isolator [as in claim 11] for an optically null component [as in claim 9]. As

substitution is no more than the use of conventionally known optical amplifier filtering means available in the optics art.

### ***Response to Arguments***

14. Applicant's arguments with respect to claims 1-18 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

15. While patent drawings are not drawn to scale, relationships clearly shown in the drawings of a reference patent cannot be disregarded in determining the patentability of claims. See In re Mraz, 59 CCPA 866, 455 F.2d 1069, 173 USPQ 25 (1972).

16. The references made herein are done so for the convenience of the applicant. They are in no way intended to be limiting. The prior art should be considered in its entirety.

17. The prior art which is cited but not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ari M. Diacou whose telephone number is (571) 272-5591. The examiner can normally be reached on Monday - Friday, 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571) 272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AMD 4/12/2006

  
JACK KEITH  
SUPERVISORY PATENT EXAMINER